



PRIMARY RESECTION AND ANASTOMOSIS WITH PERRECTAL FLATUS TUBE DEFLATION IN CASES OF SIGMOID VOLVULUS: A PROSPECTIVE STUDY

General Surgery

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ABSTRACT

Background: Sigmoid volvulus, a frequent cause of large bowel obstruction, results from abnormal twisting of the sigmoid colon, leading to luminal and vascular compromise. While various surgical strategies exist, the optimal management approach remains debated, especially in resource-limited settings. **Objective:** This prospective study aimed to evaluate the safety, feasibility, and outcomes of primary resection and anastomosis (PRA) with perrectal flatus tube decompression in patients presenting with sigmoid volvulus. **Methods:** The study duration was 2023-2024 (18 months). Conducted at BRD Medical College, this study included 50 adult patients diagnosed with sigmoid volvulus. After clinical and radiological confirmation, eligible patients underwent PRA with intraoperative perrectal decompression. Postoperative outcomes, complications, and recovery parameters were monitored over a 30-day period and analyzed using SPSS v26.0. **Results:** Among the 50 patients, 70% were male, and 60% were over 50 years of age. The mean surgery duration was 176 minutes, and average hospital stay was 13.18 days. Postoperative complications included wound infection (18%), anastomotic leak (12%), and pelvic abscess (10%), with a 30-day mortality rate of 12%. A majority of patients resumed daily activities within 30 days. Lifestyle factors such as smoking (50%) and alcohol use (36%) were common, and 30% had underlying comorbidities. **Conclusion:** Primary resection and anastomosis with perrectal flatus tube deflation is a safe and effective single-stage surgical option for sigmoid volvulus. It offers favorable outcomes in selected patients, minimizes the need for stoma formation, shortens hospital stay, and enhances early return to normalcy, making it particularly valuable in settings with limited resources.

KEYWORDS

Primary resection and anastomosis, Sigmoid volvulus, Hartmann's operation

INTRODUCTION

One of the common surgical conditions that humans have been aware of since the beginning of time is sigmoid volvulus. It is an aberrant 180-degree twist of the sigmoid colon on its own mesenteric axis. Bowel ischemia is the initial outcome, which is followed by obstruction of the intestinal lumen and, if left untreated, obstruction of the mesenteric arteries. A knot may occasionally form when the small bowel becomes stuck along the sigmoid volvulus. Researchers call this ileo-sigmoid knotting.^[1] Usually, middle-aged or elderly males are sufferers.^[2] The prevalence of sigmoid volvulus as a cause of large bowel obstruction varies greatly geographically, from 1 to 7% in the United States^[3] to nearly 80% in the Andes.^[4] In areas such as Eastern Europe, India, and Africa, however, it accounts for a far greater proportion of bowel obstructions. Despite its proven epidemiologic and clinical manifestations, the ideal treatment strategy remains a topic of ongoing debate.^[5-7] Treatment for sigmoid volvulus involves decompression through endoscopic detorsion or emergency laparotomy, with surgical methods including primary resection, anastomosis, Hartmann's operation, mesosigmoidoplasty, and sigmoidopexy.^[8,9]

Primary resection and anastomosis (PRA) is the preferred surgical approach for hemodynamically stable patients with no signs of peritonitis or gangrene.^[10] A retrospective study of patients with sigmoid volvulus showed that PRA with perrectal flatus tube emptying correlated with better postoperative outcomes, reduced anastomotic leakage and minimized hospital stay.^[11] Sigmoid volvulus is anatomically predisposed by abnormalities of the mesocolon that allow excessive rotation of the colon.^[12]

The mortality rate in patients with sigmoid volvulus depends on the time to diagnosis and intervention. Delayed intervention increases the likelihood of intestinal ischemia and perforation leading to sepsis and multi-organ failure.^[13] Early surgical intervention leads to a relatively low mortality rate; however, in difficult cases this rate can exceed 30%.^[14]

This prospective study aims to assess the efficacy and safety of PRA in conjunction with a perrectal flatus probe in individuals diagnosed with volvulus sigmoideus.

MATERIALS AND METHODS

Study Design

The study design was a prospective cohort study conducted at the emergency department of the Department of Surgery, B.R.D Medical College, from 2023 to 2024. The study focused on patients diagnosed with sigmoid volvulus presenting with features of intestinal obstruction.

Study Population, Data Collection, and Analysis

The study population included all adult patients admitted with sigmoid volvulus within the emergency department. Data for these patients were obtained from hospital records, emergency department logs, and surgical registry books. The eligibility of each patient was determined based on inclusion and exclusion criteria.

Patients who failed to meet the inclusion criteria or whose medical records were incomplete were excluded from the study. A structured data collection tool was used, adapted from previous similar studies. The principal investigator trained the data collectors on the purpose of the study and data collection procedures before the study commenced. Data collection was conducted from November 2023 to January 2024, with the investigator supervising throughout the process.

SPSS version 26.0 was used to code, clean, and analyze the gathered data. Using the Kolmogorov-Smirnov test, continuous variables were examined for normality. A p-value of less than 0.05 is regarded as statistically significant, and binary logistic regression was used for the statistical analysis. To confirm statistical significance, relevant variables were included in a multiple regression model and assessed at a 95% confidence interval (CI).

Study Procedure

All patients underwent a thorough clinical history review, examination, and necessary investigations before surgery. Depending on the severity, patients underwent either resection anastomosis or Hartmann's procedure, with exploratory laparotomy, bowel derotation, and decompression performed as needed. Primary colorectal anastomosis was done unless a colostomy was required for critically ill patients. Postoperatively, patients were closely monitored

for complications such as anastomotic leaks, paralytic ileus, wound infection, and mortality over a 30-day period. Surgery was conducted under general anesthesia, where the sigmoid volvulus was derotated, redundant bowel resected, and manual decompression performed. After ensuring tension-free margins, an end-to-end colorectal anastomosis was completed, with bilateral abdominal drains placed before closure. Postoperative care included IV fluids, analgesics, antibiotics, and strict monitoring, with patients kept nil per oral until bowel sounds resumed. On the sixth day, ultrasonography was performed to check for intra-abdominal fluid collection, and drains were removed. Patients were discharged once stable and tolerating a full diet, with a follow-up period of two months post-discharge.

Ethical Considerations

Institutional Ethics Committee approval was obtained before the study commenced, and written informed consent was secured from all participants before enrolment.

RESULTS

A total of 50 patients with sigmoid volvulus were included in this prospective study. The majority were males (70%) and aged over 50 years (60%) (Table 1, Figure 1,2).

Table 1. Demographic Distribution Of Patients (N=50)

Characteristic	Category	Frequency (n)	Percentage (%)
Age (years)	≤40	12	24.0%
	41–60	18	36.0%
	>60	20	40.0%
Gender	Male	35	70.0%
	Female	15	30.0%
BMI Category	Normal (18–22.99kg/m ²)	25	50.0%
	Overweight(23.0-24.99 kg/m ²)	19	38.0%
	Obese (≥25kg/m ²)	6	12.0%

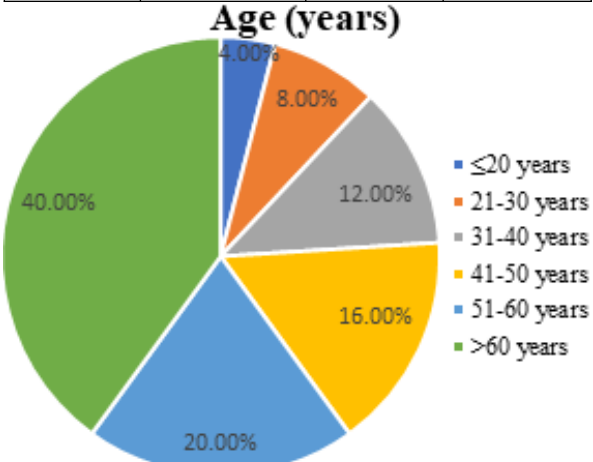


Figure 1: Age-wise Distribution Of Patients

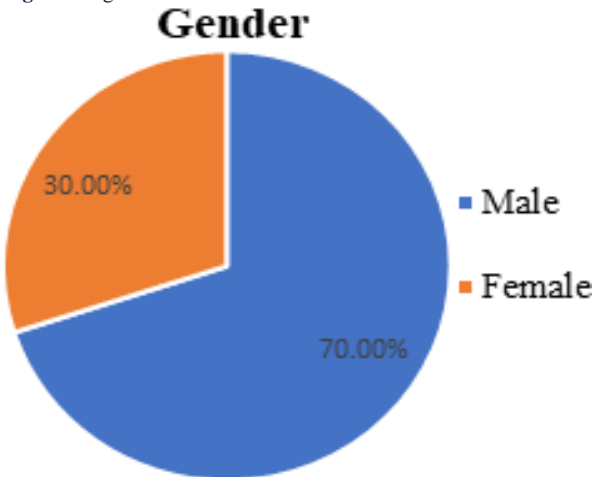


Figure 2: BMI Distribution

Surgical And Clinical Parameters

Mean duration of surgery was 176 minutes. Hemoglobin levels were >9 g/dL in 82% of patients (Table 2).

Table 2. Perioperative Parameters

Parameter	Mean ± SD	Range
Duration of surgery (minutes)	176 ± 37.85	120 – 250
Hemoglobin (g/dL)	-	≤9 in 18% patients
Hospital stay (days)	13.18 ± 6.49	2 – 28
ICU stay (days)	1.62 ± 1.61	0 – 5
Return to work (days)	29.84 ± 7.50	15 – 45

Postoperative Outcomes And Complications

Complications included anastomotic leaks (12%), wound infections (18%), and pelvic abscess (10%). The 30-day postoperative mortality rate was 12% (Table 3, Figure 3).

Table 3. Postoperative Complications And Outcomes

Complication	Number of Cases	Percentage (%)
Anastomotic Leak	6	12.0%
Wound Infection	9	18.0%
Pelvic Abscess	5	10.0%
Paralytic Ileus	4	8.0%
Fecal Fistula	2	4.0%
30-day Mortality	6	12.0%

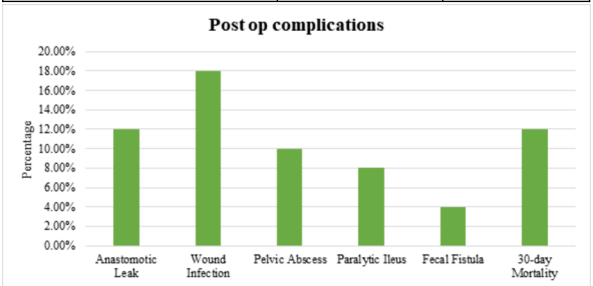


Figure 3: Frequency Of Postoperative Complications

Lifestyle And Comorbidity Analysis

A significant proportion of patients had a history of smoking (50%) or alcohol use (36%). Comorbidities were present in 30% of patients (Table 4).

Table 4. Comorbid And Lifestyle Factors

Factor	Present (n, %)	Absent (n, %)
Alcohol Use	18 (36%)	32 (64%)
Smoking	25 (50%)	25 (50%)
Comorbidities (DM, HTN)	15 (30%)	35 (70%)

DISCUSSION

In the present study, the majority of patients (40%) were aged above 60 years, followed by 20% in the 51–60 years group and 16% in the 41–50 years group. This finding suggests that sigmoid volvulus is more common in older adults, especially those over the age of 50. This is likely due to chronic constipation, colonic redundancy, and less mobility that comes with getting older. These findings are consistent with Saumya et al. (2017), who reported an age range of 25 to 75 years with a higher prevalence in older individuals.^[15] Similarly, Gupta et al. (2011) found the mean age to be 63 years.^[16]

In this study, 70% of patients were male, and 30% were female, indicating a significant male predominance. Saumya et al. (2017) observed 40 males out of 48 cases.^[15] In this study, 50% of patients had normal BMI, 38% were overweight, and 12% were obese. Gupta et al. (2011) noted BMI as a component of preoperative evaluation, finding comparable BMI across treatment groups.^[16]

Anemia was observed in 18% of patients (9/50), while 82% had hemoglobin levels above 9 g/dL. The mean operative time was 176 minutes, consistent with findings from Ravi et al. (2019)^[17] and Chauhan et al. (2015).^[18]

The mean hospital stay was 13.18 days, with most patients hospitalized for 10–16 days. These findings align with Saumya et al. (2017), Riogi et al. (2013), and Chalya et al. (2015).^[15,19,20]

The study observed a mean ICU stay of 1.62 days, with most patients

requiring intensive care for only 0 to 2 days. While limited research has specifically addressed ICU duration, these findings are indirectly supported by Ravi et al. (2019), who noted that hemodynamically stable patients undergoing primary resection tended to have smoother recoveries and earlier discharges.^[17]

The mean time for patients to resume daily activities and work was 29.84 days. Gupta et al. (2011) noted an earlier return to normal activity in patients undergoing tube sigmoidostomy compared to more invasive procedures like sigmoidopexy.^[16] The 30-day postoperative mortality rate was 12%, primarily affecting elderly patients, those with comorbidities, and cases complicated by anastomotic leak and sepsis. This rate is consistent with literature, emphasizing the importance of timely diagnosis and surgical judgment. Chalya et al. (2015) reported a 17.1% mortality rate, with predictors including advanced age, gangrenous bowel, late presentation, and comorbidities.^[20]

The most frequently observed postoperative complication was superficial wound infection (18%), followed by anastomotic leak (12%) and pelvic abscess (10%). Mishra et al. (2018) reported a higher incidence of wound infections (29.16%) and a slightly lower rate of anastomotic leaks (8.33%) following resection and primary anastomosis (RPA) in cases involving gangrenous bowel, with an overall mortality rate of 12.5%.^[21] In contrast, Bajaj et al. (2018) observed lower rates of anastomotic leaks (3%) and abscesses (3%), while wound infection remained similar at 20%, highlighting infections as a leading postoperative complication and a potential contributor to mortality.^[22]

In terms of lifestyle factors, 36% of patients reported alcohol use, and 50% were smokers. Although direct comparative data are limited, Chalya et al. (2015) and Raru et al. (2015) emphasized the role of alcohol consumption and smoking in negatively impacting bowel health and delaying recovery.^[20,23]

Only 30% of patients had comorbid conditions such as diabetes, hypertension, or COPD, suggesting that sigmoid volvulus can occur in individuals without major underlying illnesses. However, comorbidities remain an important consideration in predicting postoperative outcomes. Gupta et al. (2011) emphasized incorporating ASA scores and existing comorbidities into treatment planning.^[16]

CONCLUSION

The study looked at primary resection, anastomosis, and perrectal flatus tube deflation. The male predominance (70%) suggests either a higher incidence in men or gender-related differences in healthcare-seeking behavior. A significant proportion of patients were overweight or obese (50%), which may have implications for disease severity and postoperative outcomes.

Primary resection and anastomosis with perrectal flatus tube deflation is an effective, cost-efficient treatment for sigmoid volvulus, offering several advantages over multi-stage procedures. It ensures a shorter hospital stay, avoids the need for a second surgery, and reduces ICU dependency, making it a financially viable option, especially in resource-limited settings. Unlike stoma formation, it prevents complications such as infections, electrolyte imbalances, and hernias while also mitigating social stigma and psychological distress. This approach allows immediate bowel continuity restoration, enabling faster reintegration into daily life. Overall, it is a safe and efficient alternative to staged procedures, minimizing morbidity and financial burden.

REFERENCES

1. Kotisso B, Bekele A. Ilio-sigmoid knotting in Addis Ababa: a three-year comprehensive retrospective analysis. *Ethiopian Medical Journal*. 2006; 44(4):377-83.
2. Ali M, Hashmi Z, Zafar A. Management of acute sigmoid volvulus, using one stage resection and anastomosis without colonic lavage. *Gomal Journal of Medical Sciences*. 2009; 7(2).
3. Swenson BR, Kwaan MR, Burkart NE, Wang Y, Madoff RD, Rothenberger DA, Melton GB. Colonic volvulus: presentation and management in metropolitan Minnesota, United States. *Diseases of the Colon & Rectum*. 2012; 55(4):444-9.
4. Gingold D, Murrell Z. Management of colonic volvulus. *Clinics in Colon and Rectal Surgery*. 2012; 25(4):236-44.
5. Sahu KK, Sherif AA, Lopez CA. Omega sign: Radiological appearance of sigmoid volvulus. *Journal of Medical Imaging and Radiation Oncology*. 2019; 63(1):82-3.
6. Ishibashi R, Niikura R, Obana N, Fukuda S, Tsuboi M, Aoki T, Yoshida S, Yamada A, Hirata Y, Koike K. Prediction of the clinical outcomes of sigmoid volvulus by abdominal X-ray: AXIS classification system. *Gastroenterology Research and Practice*. 2018; 2018(1):8493235.
7. Atamanalp SS. Comments on contemporary management of sigmoid volvulus. *Journal of Gastrointestinal Surgery*. 2019; 23(2):391-2.
8. Lambrechts DP, Edomskis PP, van der Bogt RD, Kleinrensink GJ, Bemelman WA,

- Lange JF. Sigmoid resection with primary anastomosis versus the Hartmann's procedure for perforated diverticulitis with purulent or fecal peritonitis: a systematic review and meta-analysis. *International Journal of Colorectal Disease*. 2020; 35:1371-86.
9. Srivastava CS, Saxena A. Study of clinical and epidemiological profile of thyroid swelling. *International Journal of Medical Research & Review*. 2015; 3(8):789-93.
10. Ryan OK, Ryan EJ, Creavin B, Boland MR, Kelly ME, Winter DC. Systematic review and meta-analysis comparing primary resection and anastomosis versus Hartmann's procedure for the management of acute perforated diverticulitis with generalised peritonitis. *Techniques in Coloproctology*. 2020; 24:527-43.
11. Atamanalp SS, Dişi E, Pekşöz R, Korkut E, Aksungur N, Altundaş N, Kara S. Recurrence-preventive role of flatus tubes following endoscopic decompression in sigmoid volvulus. *The Turkish Journal of Gastroenterology*. 2023; 34(4):371.
12. Raventhiran V, Madiba TE, Atamanalp SS, De U. Volvulus of the sigmoid colon. *Colorectal Disease*. 2010; 12(7Online):e1-7.
13. Cirocchi R, Farinella E, La Mura F, Morelli U, Trastulli S, Milani D, Di Patrizi MS, Rossetti B, Spizzirri A, Galanou I, Kopanakis K. The sigmoid volvulus: surgical timing and mortality for different clinical types. *World Journal of Emergency Surgery*. 2010; 5:1-5.
14. Shahmoradi L, Safdari R, Mirhosseini MM, Arji G, Jannat B, Abdar M. Predicting risk of acute appendicitis: a comparison of artificial neural network and logistic regression models. *Acta Medica Iranica*. 2018; 784-95.
15. Saumya, Nizami S, Shaw RK, Saba. Acute twisted bowel – management by resection and primary anastomosis. *International Journal of Recent Trends in Science and Technology*. 2017; 21:228-30.
16. Gupta SS, Singh O, Paramhans D, Mathur RK. Tube sigmoidostomy: a valuable alternative to sigmoidopexy for sigmoid volvulus. *Journal of Visceral Surgery*. 2011; 148(2):e129-33.
17. Ravi V, Jahangir M. Comparison of primary resection anastomosis with Hartmann's procedure in the management of acute sigmoid volvulus. *Annals of International Medical and Dental Research*. 2019; 5(1):SG34-SG36.
18. Chauhan A, Gangji A, Menon AV. Comparison of primary resection and anastomosis with defunctioning stoma in cases of uncomplicated sigmoid volvulus patients: a retrospective study. *Scholars Journal of Applied Medical Sciences*. 2015; 3(2G):991-4.
19. Riogi B, Odhiambo K. Safe resection and primary anastomosis of gangrenous sigmoid volvulus. *The Annals of African Surgery*. 2013; 10(1):1-8.
20. Chalya PL, Mabula JB. Sigmoid volvulus and ileo-sigmoid knotting: a five-year experience at a tertiary care hospital in Tanzania. *World Journal of Emergency Surgery*. 2015; 10:10.
21. Mishra BM, Mishra S, Sahoo B. Primary resection and anastomosis in gangrenous sigmoid volvulus – a prospective study. *Journal of Medical Science and Clinical Research*. 2018; 6:683-7.
22. Bajaj J, Thakur DS, Sharma DB, Sharma D. Is primary resection and anastomosis, without proximal stoma safe in gangrenous sigmoid volvulus? *World Wide Journal of Multidisciplinary Research and Development*. 2018; 4(1):194-6.
23. Raru Y, Messmer P, Williams A, Sultan D, Adale A, Shiferaw Y, Hart P, Pettigrew H. Treatment of sigmoid volvulus by deflation versus surgery: a single site report. 2015; 5:247.